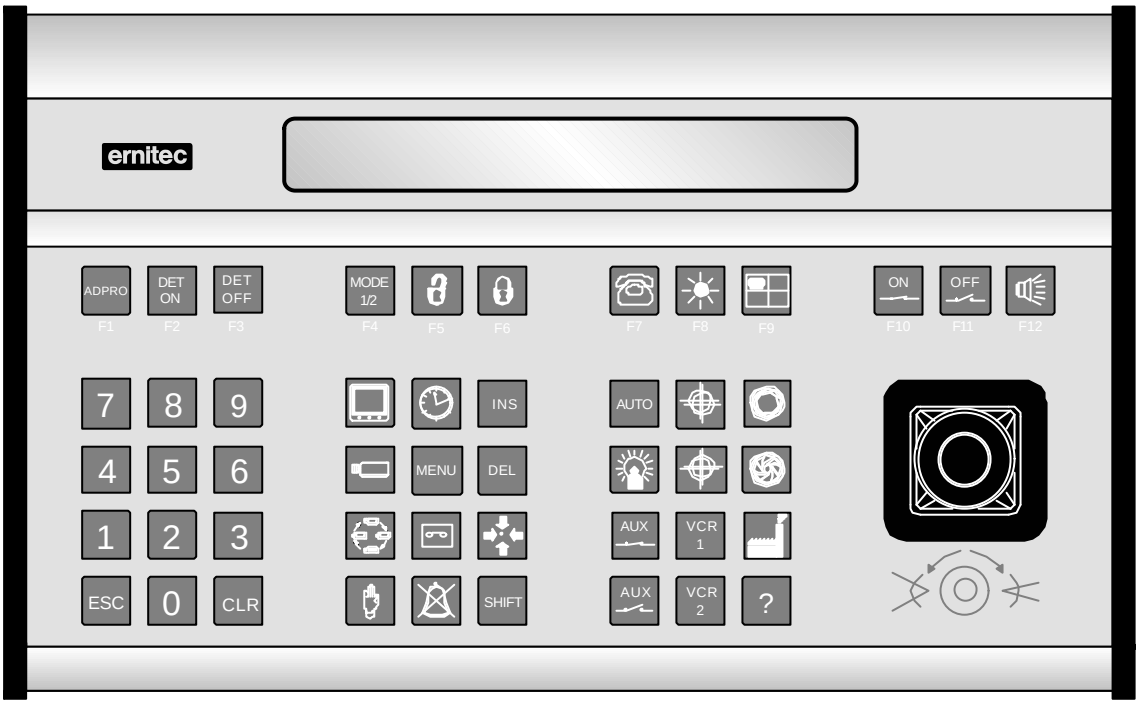
Installation and Setup Instruction
for
Keyboard 1500M, 1501M, 1502M & 1503M

CE



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2821-00037, Rev.170898

Validity

This manual covers the following keyboards:

- Keyboard type 1500M, 1501M, 1502M or 1503M software version 1.1 Release 17.08.98 or later.

Compatibility

The Series 1500 keyboards are compatible with the following equipment:

- SYSTEM 500M/1000M
  1501M/1503M: Software Version 4.1 Release 10.03.97, or later.
  1502M: Any version; however the Adpro functions are available only when supported by the matrix software.
  1500M: Any version.
- Series BDR-510 telemetry receiver, software V.1.0 Release 05.11.96, or later.
- Series BDR-550 telemetry receiver, software V.2.0 Release 16.10.96, or later.
- BDR-575 telemetry receiver, software version 1.0 Release 13.03.97, or later.
- Integrated Camera Unit (ICU), software version 1.0.

Approvals

All keyboard types are CE certified and approved with respect to EN 50081-1 and EN 50130-4 (EMC) and EN 60950 (LVD).

Introduction

The keyboards Series 1500 can be used for operating SYSTEM 500M and SYSTEM 1000M as well as for direct operation of telemetry receivers Series BDR-510, Series BDR-550, BDR-575 and Integrated Camera Units (ICU).

However, variable speed operation of BDR-575 and the ICU is only possible when used with keyboard 1501M or 1503M.

Keyboard types

- **Keyboard 1500M** is equipped with a serial port with selectable RS-232/RS-485 interface.
- **Keyboard 1501M** is furthermore equipped with a joystick for variable speed operation of BDR-575 and the ICU.
- **Keyboard 1502M** is equipped with a serial port with selectable RS-232/RS-485 interface and an ARC-net port for connection to SYSTEM 500M and 1000M. A LCD display with two lines of each 40 characters and back light illumination are used as status display and for user messages. The keyboard features *Site selection* and *Macro functions* and is able to control the *Adpro integration* features in connexion with SYSTEM 1000M, and SYSTEM 500M. For further information on these subjects, refer to the *SYSTEM 500M/1000M User- and Programming Manuals*.
- **Keyboard 1503M** is furthermore equipped with a joystick for variable speed operation of BDR-575 and the ICU.

Unpacking the keyboard

After unpacking the keyboard, carefully check for any sign of damage. Any such damage should be reported to your supplier, or to Ernitec A/S directly, before installation.
Check that the keyboard packing carton contains the following items:

- 1 Keyboard 1500M, 1501M, 1502M or 1503M.
- 1 Keyboard Installation Manual (this manual)
- 1 Connector kit
- 1 Power supply

Keyboard connections

The keyboard connections are shown on figure 1.

#	Description	
	1500M/1501M	1502M/1503M
1-10	Power supply connector for the supplied mains adaptor or for external voltage 9-18 VAC/VDC 2,7 VA	
1-11	N/A	ARC-net connector used for interconnection of SYSTEM 1000M units and keyboards.
1-12	N/A	Switch for ARC-net line termination.
1-13	RS-485/RS-232 connector used for connection of SYSTEM 500M/1000M, alarm printer or direct connection to Series BDR-500 or ICU's.	
1-14	Switch for RS-485 line termination.	

Installation

When the installation is completed make sure to set up the keyboard in accordance with the installation and the intended use; refer to the *Set-up* section.

Power connection

Connect the power supply unit to the keyboard PSU connector 1-10 (refer to figure 1) and to the mains socket.

ARC-net connection to SYSTEM 1000M

Connect the ARC-net cable to socket 1-11 (refer to figure 1):

SYSTEM 1000M		Keyboard 1502M/1503M	
Pin	Description	Pin	Description
1 or 5	Positive signal	1 or 5	Positive signal
6 or 9	Negative signal	6 or 9	Negative signal

All SYSTEM 1000M units are interconnected through the ARC-net. Also the keyboards might be connected to the ARC-net. Remember to terminate the ARC-net line in both ends of the cable. This is done by setting the belonging small switches to the 120 Ω or 100 Ω position corresponding to the characteristic impedance of the cable used, refer to fig. 1-12. Make sure, that only the first and the last physical unit on the cable is terminated, refer to figure 2 for termination instructions. On all other units the termination switches should be set to the OFF position.

Maximum cable length is approximately 1700 metres.

Note: The ARC-net is a Local Area Network, and is as such very dependant on a good quality cable installation. It is therefore important to use high quality twisted pair data transmission cable, with a characteristic impedance of 120 Ω or 100 Ω.
Warning: Do not in any way connect an optional cable shield/screen!

Recommended 120 Ω types are:

- Belden 8132 (2 pairs).
- Alcatel 6806 Ecomatch (4 pairs).

For further information on suitable cables for ARC-net, refer to the *SYSTEM 1000M Installation Instruction*.

RS-485 connection to SYSTEM 500M/1000M

Connect the RS-485 cable to socket 1-13 (refer to figure 1):

	SYSTEM 500M/1000M		Keyboard 580M/1801M/1802M	
	Pin	**Description**	**Pin**	**Description**
	6 or 8	Positive signal	6 or 8	Positive signal
	7 or 9	Negative signal	7 or 9	Negative signal
	1, 4 or 5*	GND (Connect to cable screen)	1, 4 or 5*	GND (Connect to cable screen)

Remember to terminate the RS-485 line in both ends of the cable. This is done by setting the belonging small switches to the 120 Ω or 100 Ω position corresponding to the characteristic impedance of the cable used, refer to fig. 1-14. Make sure, that only the first and the last physical unit on the cable is terminated, refer to figure 2 for termination instructions. On all other units the termination switches should be set to the OFF position.

Maximum cable length is 1200 metres.

It is recommended to use high quality twisted pair cable designed for data transmission.
*Connection of cable shield/screen is optional and will normally not be needed.

RS-485 connection to telemetry receivers Series BDR-500, the ICU and BED-108

Connect the RS-485 cable to socket 1-13 (refer to figure 1):

Series 1500		BDR-550/1		BDR-510/4		BDR-511/2/3		BDR-575		ICU		BED-108	
Pin	**Desc.**	**Pin**	**Desc.**	**Pin**	**Desc.**	**Pin**	**Desc.**	**Pin**	**Desc.**	**Pin**	**Desc.**	**Pin**	**Desc.**
6 or 8	Pos.	*X5-	PCM IN-	X7+	CTRL IN+	X12+	PCM IN+	2	N/A	1	COM+	X3+	ERNA+
7 or 9	Neg.	*X5+	PCM IN+	X7-	CTRL IN-	X12-	PCM IN-	1	N/A	2	COM-	X3-	ERNA-
1, 4, 5	GND	Do NOT connect!											

Details on interconnecting various types of telemetry receivers and termination of the RS-485 line can be found on figure 3.

Telemetry Receivers Series BDR-51X and BDR-55X and the BED-108 Control Signal Distributor Unit will terminate the RS-485 properly by themselves when installed in the correct daisy chain configuration and do not require additional line termination. The ICU and the BDR-575 are bus-connected and consequently the line must be terminated, on the ICU with an external resistor, on the BDR-575 by enabling the RS-485 LK1 jumper on the interface board.

Different types of telemetry receivers can also be mixed on the common control line.

Remember, that each telemetry receiver/ICU must have an unique address equal to the camera number minus 1, refer to the relevant telemetry receiver manual. Also the Series 1500 keyboard must be set for direct control of telemetry receivers (*CamCrtl*), refer to the *Set-up* section located later in this manual.

Maximum cable length is 1200 metres. However, telemetry receivers Series BDR-51X and BDR-55X as well as the BED-108 features an active control signal repeater allowing further 3000 meters (BDR-51X further 1200 meters) distance to the next unit.

RS-232-C connection to SYSTEM 500M/1000M

Connect the RS-232-C cable to socket 1-13 (refer to figure 1).

	SYSTEM 500M/1000M		Keyboard Series 1500	
	Pin	Description	Pin	Description
	3	Transmit	2	Receive
	2	Receive	3	Transmit
	1, 4 or 5	Ground (To cable screen also)	1, 4 or 5	Ground (To cable screen also)

Maximum cable length is 50 metres.

The RS-232 port on the 1502M or 1503M keyboard can also be used for connection to a serial printer for alarm logging, if the keyboard is connected to the SYSTEM 1000M via the ARC-net. To use the feature the SYSTEM 1000M must be set-up accordingly, refer to the *SYSTEM 1000M Programming Manual*.

Also telemetry receivers can be controlled via the RS-232 port. The Transmit signal should be connected to the positive terminal on the telemetry receiver and the GND signal to the negative terminal, except on the Series BDR-550 where the signals must be reversed.

Keyboard Set-up

When using external keyboard(s) in an matrix installation, it is important to check the factory programmed default settings for the keyboards before use to avoid conflict or dead-lock situations like several keyboards having the same address.

When used as a matrix keyboard, make sure the following parameters are set correct:

- Keyboard type=*SysKbd* / System keyboard.
- Communication media: In accordance with the interface used.
- Baud rate: In accordance with baud rate set in SYSTEM 500M/1000M.
- Keyboard address: Make sure the address set is unique.

When used for direct control of telemetry receivers/ICU's:

- Keyboard type=*CamCrtl* / Direct camera control.
- Communication media=RS-485.

Beeper

During set-up mode the key-beep sound is changed to indicate you are in set-up.

Various different beeps indicates valid or invalid selections.

Keyboards 1500M and 1501M will indicate wrong entries during set-up by no key-beep at all and will await a valid selection - set-up is not left until a valid selection has been made.

Operation of AUX relays

Set-up allow three different operation methods:

- **Latched**, or toggled function.
- **Un-latched**, or momentary, push-button, function.
- **1801M** emulation, must be selected when the keyboard is connected to SYSTEM 500M/1000M software version 2.1 or lower.
  Might also be selected when used with newer matrix software; in this case is the functionality of the AUX-relays, latched or un-latched, controlled by the matrix set-up individually for each camera.

Keyboard 1500M/1501M Setup

If several parameters should be changed it is necessary to start from the beginning with each parameter, by pressing the ESC and MENU keys at the same time, and entering the password. The default password is 0000 (four times zero).

Default settings

The default settings are indicated with an '*****' on the next page.
Each time a setting is changed, the keyboard is automatically re-booted in order to activate the new setting. Invalid entries are not accepted, indicated by no key-beep.

Quick set-up

The basic settings of the keyboards 1500M/1501M can easily be set up, by pressing the following keys during power ON of the keyboard:

ESC + **0**: Direct Camera Control - RS485 - 2400 baud
ESC + **2**: System Keyboard - RS232 - 19200 baud - Keyboard no. 2/3
ESC + **3**: System Keyboard - RS485 - 19200 baud - Keyboard no. 3
ESC + **4**: System Keyboard - RS485 - 19200 baud - Keyboard no. 4
ESC + **5**: System Keyboard - RS485 - 19200 baud - Keyboard no. 5
ESC + **6**: System Keyboard - RS485 - 19200 baud - Keyboard no. 6
The remaining settings are not affected by the above quick set-up procedure.

Change the keyboard type

- Press the key **1** to change the keyboard type.
- Press **1** to set the keyboard for **Direct Camera Contro**l, press **2** to set the keyboard for **System Control**.

Change of keyboard address

- Press the key **2** to change the **keyboard address**, press a number between **3** and **6** indicating the new **keyboard address**.

Change the baud rate

- Press the key **3** to change the **baud rate** setting.
- Press the key **1** for 1200 baud, **2** for 2400, **3** for 4800, **4** for 9600, **5** for 19200 or **6** for 38400 **baud rate**.

Change the interface type

- Press the key **4** to change the **interface** type.
- Press **1** to set RS-232 **interface**, press **2** to set RS-485 **interface**.

Change the function of the AUX relays (refer to the *AUX relays* section on page 5)

- Press the key **5** to change the function of the **AUX relays**.
- Press **1** for latched function, **2** for un-latched, **3** for 1801M mode.

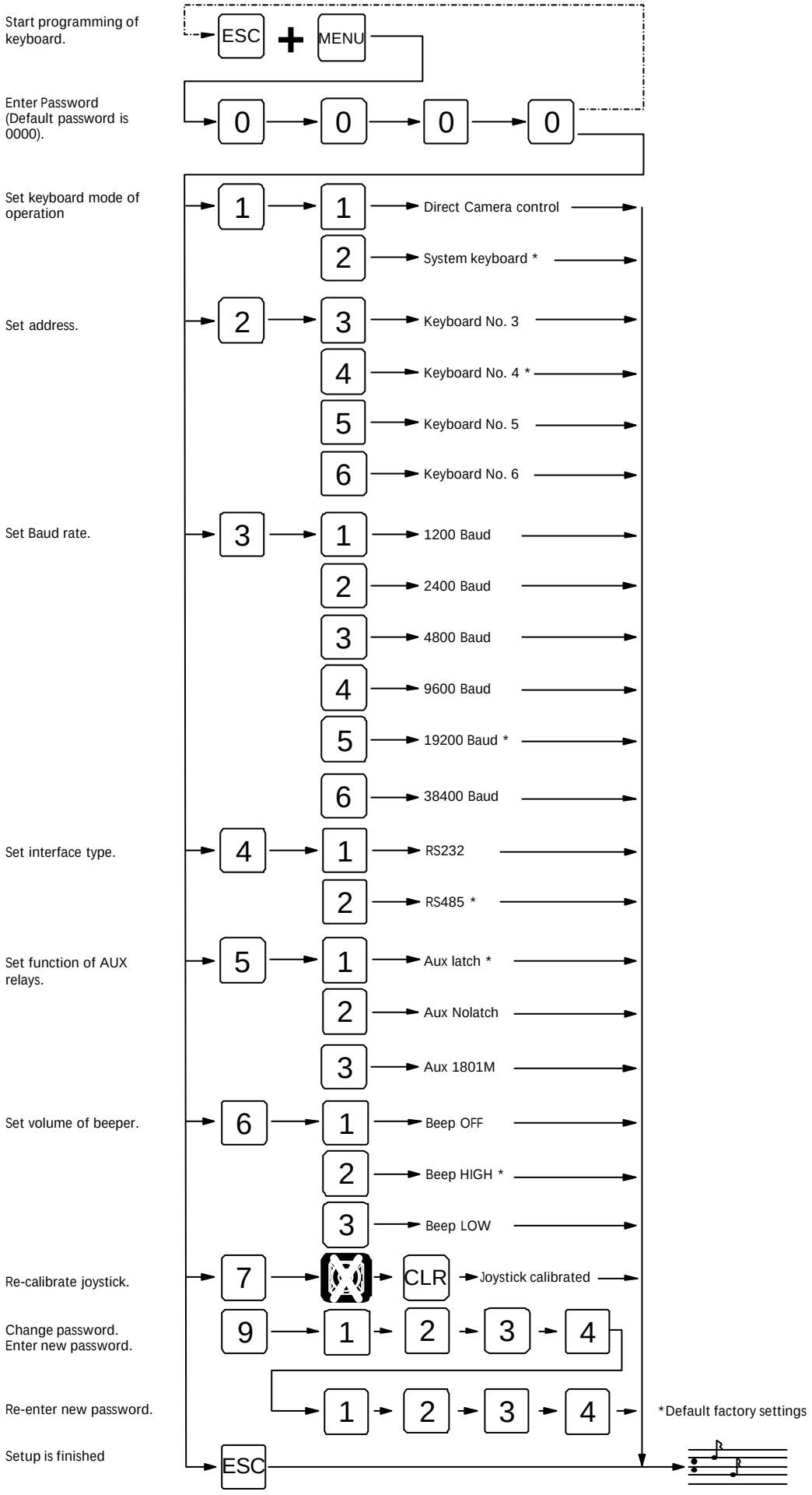
Calibrate joystick (1501M only)

This is a service function. Use this function to re-calibrate the joystick in case e.g. pan & tilts are moving although the joystick is released.

- Press the key **7** to activate the function
- Release the joystick, including the focus!
- Press the **CLR** key to calibrate the joystick.

Change the password

Press the key **9** to change the **password**, and enter the new **password** (4 digits). Re-enter the new **password**.


Start programming of keyboard.
ESC
+
MENU
Enter Password (Default password is 0000).
0
0
0
0
Set keyboard mode of operation
1
1
Direct Camera control
2
System keyboard *
Set address.
2
3
Keyboard No. 3
4
Keyboard No. 4 *
5
Keyboard No. 5
6
Keyboard No. 6
Set Baud rate.
3
1
1200 Baud
2
2400 Baud
3
4800 Baud
4
9600 Baud
5
19200 Baud *
6
38400 Baud
Set interface type.
4
1
RS232
2
RS485 *
Set function of AUX relays.
5
1
Aux latch *
2
Aux Nolatch
3
Aux 1801M
Set volume of beeper.
6
1
Beep OFF
2
Beep HIGH *
3
Beep LOW
Re-calibrate joystick.
7
CLR
Joystick calibrated
Change password. Enter new password.
9
1
2
3
4
Re-enter new password.
1
2
3
4
*Default factory settings
Setup is finished
ESC

Keyboard 1502M/1503M Set-up

In order to start programming press the **ESC** and **MENU** keys at the same time and enter the password (4 digits). The default password is 0000.

In order to exit programming press the ESC key, and the keyboard will automatically be re-booted in order to activate the new setting(s).

Default settings

The main default settings are factory programmed as follows:

- Keyboard type: System keyboard
- Communication: ARC NET
- Address : 4
- Baud rate: 312,50 Kbs
- Password: 0000

Change keyboard type

- Press the key **F4** to toggle between **SysKbd** or **CamCrtl**.

Change communication media

- Press the key **F6** to toggle between **ARC NET** - **RS232** - **RS485**

Set baud rate

- Press the **F7** key to toggle between the valid baud rates.

Change of keyboard address

- Press the **F9** key to get to the **Kdb.No** menu.
- Press the **F4** key to toggle between the valid keyboard numbers.

Set the function of the AUX keys

- Press the **F9** key to get to the **AUX** menu.
- Press the **F6** key to toggle between **Latch/No Latch/1801M** function.

Change the password

- Press the **F9** key to get to the **Change Password** menu.
- Press **F7** and enter the new password (4 digits).
- Re-enter the new password.

Set the volume of the key-press beeper

- Press the **F9** key to get the **Beep** menu.
- Press the **F4** key to toggle between **HIGH** - **LOW** - **OFF**.

Test and re-calibrate joystick

Use this function to re-calibrate the joystick in case e.g. pan & tilts are moving although the joystick is released.

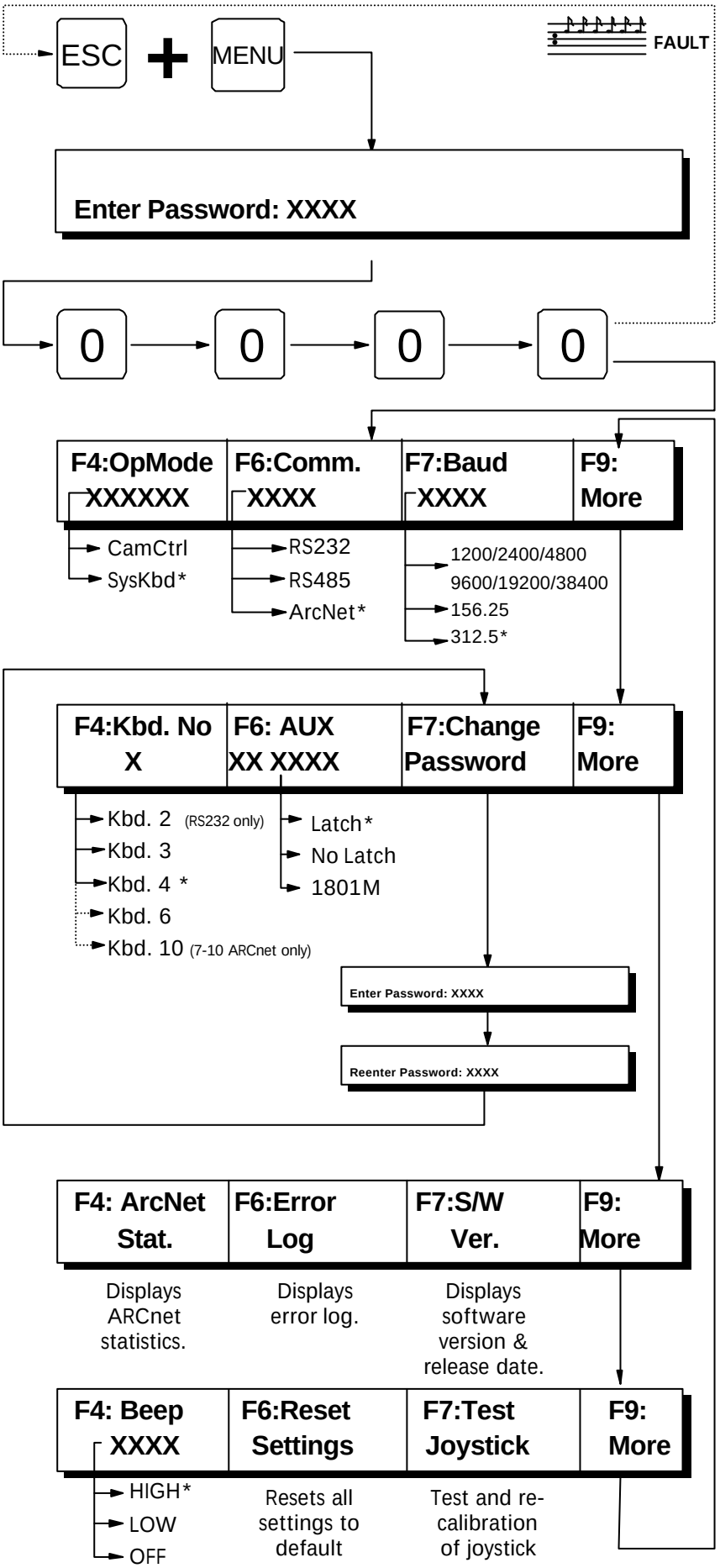
- Press the **F9** key to get the **Test joystick** menu.
- Press the **F7** key to enter the test and re-calibation functions.

Start programming of keyboard.
Press ESC to leave set-up.

OK

FAULT

Enter Password
(Default password is 0000)



Select Mode of operation, Baud rate and communication interface.

Set keyboard address.
Set Function of AUX relays in BDR-5XX/ICU
Change password.

Service menu only

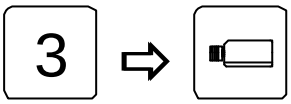
Set beeper tone.
Reset keyboard settings to default (marked with an *).
Test and re-calibrate joystick.

Operation of telemetry receivers

This section will describe operation telemetry receivers diretly from the Series 1500 keyboard when mode of operation is set to Camera Control. For operation of the SYSTEM 500M or 1000M, refer to the *SYSTEM 500M/1000M User Manual*.

Select Camera

If Camera 3 is to be controlled:



Select camera number 3

All subsequent operations are now directed to camera 3 (=address 2) until a new camera is selected.

Select all cameras (broadcast)

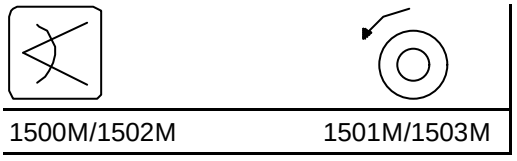
If all cameras should be operated simulteneously, press:

Broadcast commands

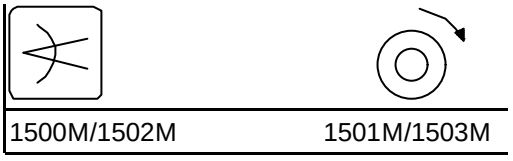
Warning: When e.g. activating the pan functions all cameras will pan! The broadcast function should therefore be used with care!

Zoom

Change the focal length:



Zoom wide



Zoom narrow

Focus

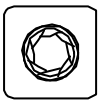
If the picture on the selected monitor is not in focus, press:

Focus near

Focus far

Iris

If the picture on the monitor is too dark or light, press:



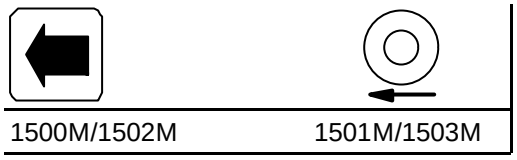
Iris open

Iris close

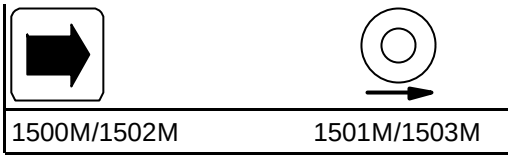
Note: Available only if supported by the connected equipment.

Pan Camera

If the camera should be panned left or right, press:



Pan left

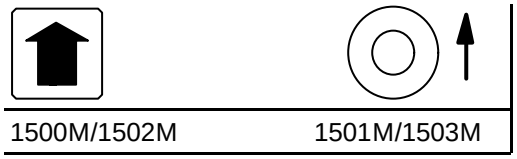


Pan right

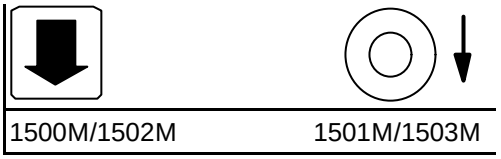
JOYSTICK NOTE: When controlling a variable speed Pan/tilt, BDR-575 or ICU, pushing the joystick towards its extremes will increase speed.

Tilt Camera

If the camera should be tilted up or down, press:



Tilt up

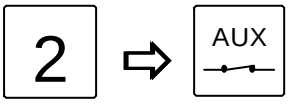


Tilt down

JOYSTICK NOTE: When controlling a variable speed Pan/tilt, BDR-575 or ICU, pushing the joystick towards its extremes will increase speed.

Activating an AUX-relay

To activate AUX-relay 2, press:

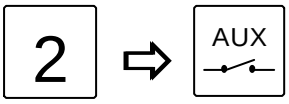


Activate AUX 2 relay.

*Note: If the Keyboard 1500 is set for **No Latch** operation the relay is automatically de-activated when the AUX-key is released. If set for **Latch** operation the relay will remain activated when the key is released.*

De-activating an AUX-relay

To de-activate AUX-relay 2, press:

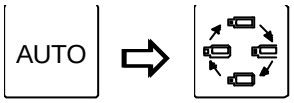


De-activate AUX 2 relay.

*Note: Used only if the Keyboard 1500 is set for **Latch** operation.*

Auto panning (BDR-575 and ICU only)

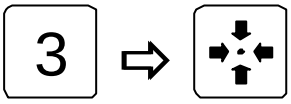
To start auto panning, press:



Start auto panning

Call Preposition (not available on Series BDR-51X)

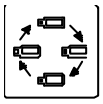
To call preposition number 3, press:



Call preposition number 3
Note: Valid range BDR-55X and ICU: 1-30, BDR-575: 1-126.

Start Sequence of pre-positions

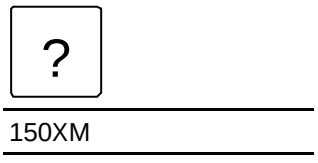
To start the pre-programmed sequence of pre-positions, press:



Start sequence.
The sequence of pre-positions is automatically aborted when another function is operated.

Remove/insert text (Series BDR-550 only)

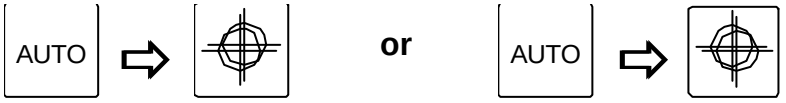
Remove/insert the text generated by the currently controlled telemetry receiver:



Remove or Insert text from telemetry receiver

Auto focus (ICU only)

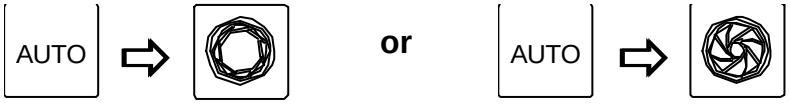
In order to switch to auto focus, press:



Enable auto focus

Auto iris (ICU only)

In order to switch to auto iris, press:



Enable auto iris

Back light compensation (ICU only)

In order to enable/disable Back light compensation, press:

Back light compensation ON/OFF

Programming the ICU, BDR-55X & BDR-575 Telemetry Receiver

The programming features are not available on the telemetry receivers Series BDR-51X.

Save preposition

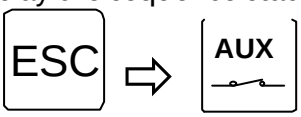
To save preposition number 3, move the camera to the desired view, and press:

Save preposition number 3

Note: Valid range BDR-55X and ICU: 1-30, BDR-575: 1-126.

Display preposition sequence stack (available on the BDR-55X only)

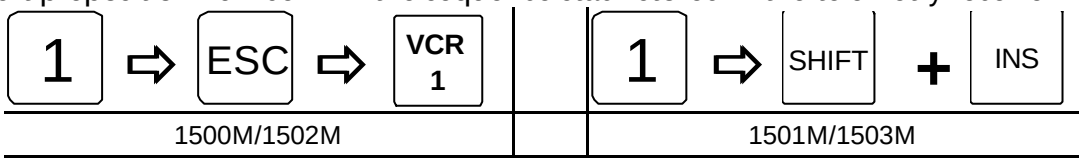
To display the sequence stack stored in the telemetry receiver currently being controlled:



Display preposition sequence stack

Insert a preposition in the sequence stack

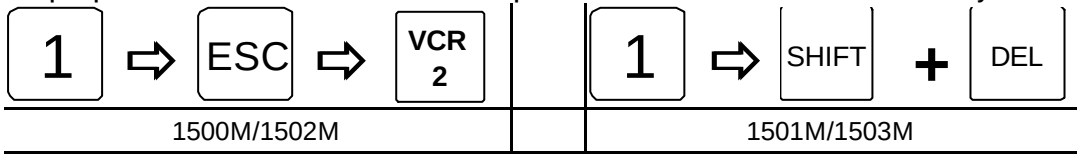
To insert preposition number 1 in the sequence stack stored in the telemetry receiver:



Insert preposition number 1 in the sequence stack

Delete a preposition from the sequence stack

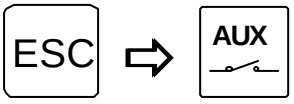
To delete preposition number 1 from the sequence stack stored in the telemetry receiver:



Delete preposition number 1 from the sequence stack

Clear the preposition sequence stack

Clear the preposition sequence stack stored in the telemetry receiver currently being controlled:



Clear the preposition sequence stack

Set the pre-position sequence dwell time

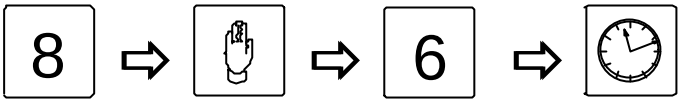
To set the dwell time for the telemetry receiver currently being controlled to 15 seconds, press:

Set dwell time to 15 sec.

The dwell time range is 0 to 255 sec.

Set Home position

To use preposition 8 as Home-position with a time-out of 60 seconds, press:

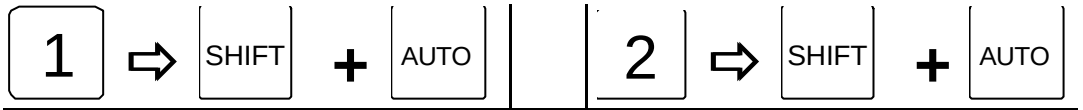


Use pre-position 8 as Homeposition with a 60 sec. time-out

Note, that the time-out entry automatically is multiplied with 10.
Max. time-out entry is 255 corresponding to 2550 seconds.

Set Auto panning limits (available on the ICU & BDR-575 only)

To set the two limit positions for auto panning, for the camera being controlled:



1501M/1503M only		1501M/1503M only
Set auto panning limit 1		*Set auto panning limit 2*